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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/529,866

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Yuji Yamanishi

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EXAMINER

SAVAGE, JASON L

ART UNIT

PAPER NUMBER

1794

MAIL DATE

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12/31/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/529,866

Applicant(s)

YAMANISHI ET AL.

Examiner

Jason L. Savage

Art Unit

1794

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 October 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2 and 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okabe et al. (US 2003/0228949) in view of Cole (US 5,711,187).

Okabe teaches a sintered gear sprocket composed of a sintered alloy having densified surface portions on the gear sprocket structure (par[0013]). Okabe further teaches that treated sprocket is formed by compressing the alloy material, then sintered, and rolled to form densified layers on the sprocket teeth having a thickness between 200 to 800 microns (par[0031]).

Regarding the limitation that a first densified layer having a thickness of 300 to 1,000 is formed on the tooth surface and a second densified layer having a thickness of 10 to 300 microns is formed on the bottom land; the subject matter as a whole which was disclosed by Okabe would have been obvious to one having ordinary skill in the art at the time the invention was made. It would have been obvious to have selected the overlapping portion of the range disclosed by the reference such as having a thickness of 300 microns because overlapping ranges have been held to be a prima facie case of obviousness, see *In re Malagari* 182 USPQ 549.

Regarding the limitation the boundary of the first densified layer is continuous with a boundary of the second densified layer without a substantial level difference,

Since Okabe teaches a rolling step and is silent to having different rolling allowances such as taught by Applicant on page 10, lines 16-19 of the specification, one of ordinary skill would have expected the densified layer to have been continuous without a substantial level difference. The Patent and Trademark Office can require Applicant to prove that prior art products do not necessarily or inherently possess characteristics of claimed products where claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes; burden of proof is on Applicants where rejection based on inherency under 35 U.S.C. § 102 or on prima facie obviousness under 35 U.S.C. § 103, jointly or alternatively, and Patent and Trademark Office's inability to manufacture products or to obtain and compare prior art products evidences fairness of this rejection, *In re Best*, Bolton, and Shaw, 195 U.S.P.Q. 431 (CCPA 1977).

Regarding the limitation that the porosity of the sintered alloy is 10 to 15%, Okabe is silent to the porosity of the sintered gear prior to densification of the surface. Cole teaches a sintered gear sprocket composed of a sintered alloy having densified surface portions on the gear sprocket structure (col. 1, ln. 5-23). Cole further teaches that treated sprocket is formed by compressing the alloy material, then sintered, and rolled to form densified layers on the sprocket teeth and bottom land (col. 1, ln. 17-62). Cole also teaches that the density of the sintered gear component prior to densification of the surface is approximately 90% which would be equivalent to a porosity of 10% (col. 1, ln. 44-46). As such, having a porosity for a sintered component of 10% is known to be suitable for use in sintered gears having densified layers on surface. It would

have been obvious to one of ordinary skill in the art to have used a sintered gear having an initial porosity of 10% such as described by Cole since Okabe does not specify the porosity of the sintered component prior to densifying.

Regarding the limitations in the claim that the porosities in the densified layers is 10% or less and that the difference in porosity between the sintered alloy and the outermost surface of the densified layers is 7% or more by volume, the references are silent to the relative porosity difference claimed. However, Okabe teaches that the density of the densified layers may be more than 7.6 g/cm^3 (par[0019]) which would indicate that the majority of the porosity if not all has been removed by the rolling densification process. Furthermore, Cole teaches that the densified surface regions may be densified to 100% theoretical density at the surface which would be equivalent to a porosity of 0% (col. 5, ln. 15-28). As such, Cole and Okabe teach porosity ranges which overlap the ranges claimed by Applicant wherein the porosity of the sintered alloy is 10%, the porosity of the densified layers is 0% and the difference is greater than 7% by volume. It would have been obvious to one of ordinary skill in the art at the time of the invention to have formed the composite sprocket gear having any density or porosity within the claimed range with a reasonable expectation of success.

Regarding claim 2, Okabe does not explicitly recite the densified layer is formed on a tooth crest. However, it does not limit the areas where the densified layer is formed. As such, it would have been within the purview of one of ordinary skill in the art to have treated the crest of the tooth to a rolling step with a reasonable expectation of success of producing a densified surface structure. As recited above, forming the layer

having a thickness of 300 microns and a porosity of 10% or less would have been obvious.

Regarding claims 6-7, the sintered gear sprocket of Okabe is taught as being suitable for use for power transmission to a chain (par[0001]).

Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okabe et al. (US 2003/0228949) in view of Cole (US 5,711,187) as applied to claims 1-2 and 6-7 above, further in view of Fujiwara et al. (US 2003/0061904).

Okabe and Cole teach what is set forth above but are silent to the claim limitations.

Fujiwara teaches a sintered gear sprocket composed of a sintered alloy having densified surface portions on the gear sprocket structure (par[0028]). Fujiwara further teaches that the iron alloy used may be an alloy of Fe-Ni-Mo-C wherein the concentration of the alloying elements anticipate the concentrations claimed (par[0006]). Fujiwara also teaches that the overall density of the sintered gear may be between 7.04-7.07 g/cm³ (Table 1).

It would have been within the purview of one of ordinary skill in the art to have recognized that a wide variety of iron alloy materials could be used in forming the sintered gear sprocket of Okabe including the Fe-Ni-Mo-C alloy of Fujiwara with a reasonable expectation of success. Furthermore, the thus formed sintered gear sprocket would have an overall density within the range claimed in claim 5.

Response to Arguments

Applicant's arguments filed 10/1/07 have been fully considered but they are not persuasive.

Applicant argues that Okabe does not describe the porosity of the densified layers and the limitation of the difference between the porosities of the layers being 7% or more by volume. However, as was described in the rejection above, Cole teaches that it typically the porosity of the sintered alloy core is 10% and that densification of the surface layer may have porosities of between 0-10%. As such, the combination of Okabe in view of Cole would meet the claim limitations wherein the sintered alloy has a porosity of 10% and the densified surface layers have a porosity of 0%.

Applicant further argues that Okabe does not describe that the boundary of the first densified layer is continuous with the boundary of the second densified layer without a substantial level difference. However, as was described in the rejection above, since Okabe teaches a rolling step and is silent to having different rolling allowances such as taught by Applicant on page 10, lines 16-19 of the specification, one of ordinary skill would have expected the densified layer to have been continuous without a substantial level difference. Applicant has argued that forming a continuous boundary without a substantial level difference may become an issue when forming layers of different thicknesses between the first and second densified layers. However, Applicant has not provided any evidence showing that the boundary in the densified layer of Okabe in view of Cole which has a thickness of 300 microns on the tooth and

bottom land surfaces would not be continuous and/or be without a substantial (emphasis added) level difference.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

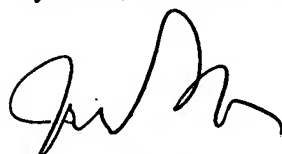
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason L. Savage whose telephone number is 571-272-1542. The examiner can normally be reached on M-F 6:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith Hendricks can be reached on 571-272-1401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Jason Savage
12-12-07



KEITH D. HENDRICKS
SUPERVISORY PATENT EXAMINER